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ABSTRACT

Reflecting the national trend toward less costly undergraduate education, ranked college faculty at the University of South Florida (USF) have generated steadily decreasing portions of total university instructional full-time equivalence (FTE), going from 72% in 1983 to 57% in 1994, while less costly graduate teaching assistants (GTAs) and adjuncts have replaced them. If this trend continues, by the year 2027, ranked faculty will generate less than 5% of USF's instructional FTE. Increasing graduate enrollment puts pressure on faculty to serve these students even as it makes more GTAs available to teach undergraduates. Both adjuncts and GTAs cost considerably less than ranked faculty. Although distance education and technology-mediated instruction may reduce these effects, it is still expected that ranked faculty will play an increasingly smaller role in undergraduate education. USF should put first priority for the use of Associate and Full professors as teachers at the graduate and upper level undergraduate courses. It is worthwhile to consider GTAs as valuable resources, especially because many eventually become adjuncts. USF may want to consider multiyear, no tenure contracts to strengthen adjunct positions. (Contains 14 figures and 16 references.) (SLD)

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USF UNIVERSITY OF SOUTH FLORIDA

Facing the Inevitable:
Adjuncts and Graduate Assistants Replace Rank Faculty in Undergraduate Instruction

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Executive Summary

At the turn of the century, higher education in the United States undertook to educate fewer than 5 percent of all high school graduates. This percentage rose to about 15 percent in 1940 and today has grown to about 60 percent. Adding to this "traditional" demand for higher education is an ever increasing demand by so-called non-traditional (older) students. Further, higher education has recently had to compete in an environment where corrections, health services and social services increasingly get the public's attention at the same time that politicians nationwide are being elected on budget-cutting platforms.

Ranked faculty are extremely expensive instructors. During America's economic boom era (1875-1964) society could afford to use such an expensive resource to teach 5 percent (1900) or even 15 percent (1940) of its youth. In today's tight economic environment, however, it no longer appears feasible to continue that level of support to teach 60 percent of high school graduates plus large numbers of non-traditional students. Reflecting society's need for less costly higher education to meet the demands of over 14 million students (Fall, 1993) is the geometric growth by community colleges in recent decades. At large universities over the past decade, student numbers have increased (particularly graduate students), while faculty numbers have remained almost the same both locally (USF) and nationally. As a result, and reflecting the national trend toward less-costly undergraduate education, at USF over the past 12 years, faculty have generated steadily decreasing portions of total university instructional FTE (from 72 percent in 1983 to 57 percent in 1994), while less costly GTAs and adjuncts have replaced them. If this trend continues as it has, one would predict that by the year 2027, ranked faculty will generate less than 5 percent of USF's instructional FTE.

Three primary factors are causal here:

1. increasing graduate enrollment puts pressure on faculty to serve those students,
2. increasing graduate enrollment makes more GTAs available to teach undergraduate courses, and
3. both adjuncts and GTAs cost considerably less than ranked faculty.

We should expect these trends to continue, and perhaps become more extreme. Certainly, public higher education no longer wears the halo it once sported when seeking legislative dollars. Also, student numbers will surely increase. Dr. Carol Twigg of EDUCOM recently noted that current estimates suggest that the average American worker will require reeducation approximately every seven years by the year 2000. If this prediction proves even partly correct, institutions of higher education will soon find themselves overwhelmed both by the substantial projected increases of high school graduates and perhaps as many as 10 million additional non-traditional students each year.

Although distance education and technology-mediated instruction may somewhat reduce these effects, simple economics indicates that we should expect ranked faculty to play an increasingly smaller role in undergraduate education, and realizing this we should:

- Put first priority for the use of Associate professors and especially Full professors to teach at the graduate and for specific upper-level undergraduate courses. Such faculty should probably be used only for "cameo" appearances in lower-level courses.

- Although GTAs will probably continue to show greater increases than adjuncts over the next several years, putting extra resources into them for instructional purposes is somewhat self-defeating, because they are "here today and gone tomorrow." This is not always true, however, because many of USF's former graduate students become adjuncts after graduation. Further, because adjuncts tend to work at doing in the "real world" what they teach in the classroom, they sometimes are more aware of undergraduate student needs than research-oriented faculty. They should therefore be considered a valued resource by USF, particularly for undergraduate instruction; and we sould realize that putting more resources into this group could prove quite valuable, both for the university and its students. We might therefore investigate the possibilities of recurring or long-term part-time and full-time adjunct contracts for individuals who fulfill specific requirements, one example of which might be instructional training such as that currently required at USF for GTAs. In fact, one might consider the type of multi-year, non-tenure-earning contracts that the future Florida Gulf Coast University is currently considering to be part of the push in this direction.

Facing the Inevitable:
Adjuncts and Graduate Assistants Replace Ranked Faculty in Undergraduate Instruction

Overview

At the turn of the century, higher education in the United States undertook to educate fewer than 5 percent of all high school graduates. This percentage rose to about 15 percent in 1940 and today has grown to about 60 percent (U.S. Bureau of the Census, 1974, 1993). Adding to this "traditional" demand for higher education is an ever increasing demand by so-called non-traditional (older) students. Recently, Carol Twigg of EDUCOM (Twigg, 1995) noted that current estimates suggest that the average American worker will require reeducation approximately every seven years by the year 2000. If this prediction proves even partly correct, institutions of higher education will soon find themselves overwhelmed both by an increasing number of high school graduates and perhaps as many as 10 million additional non-traditional students each year. Further, higher education has recently had to compete in an environment where corrections, health services and social services increasingly get the public's attention at the same time that politicians nationwide are being elected on budget-cutting platforms.

The greatest single cost in higher education is salaries[1]. At the turn of the century, society could afford to support enough highly trained ranked faculty to teach 5 percent of high school graduates. In today's economy, it no longer appears feasible to continue that level of support to teach 60 percent of high school graduates plus large numbers of non-traditional students. Reflecting this trend toward less costly higher education is the geometric growth of community colleges in recent decades. At USF, over the past decade, in the face of increasing numbers of students combined with limited budget increases, the role of expensive ranked faculty has steadily shrunk in both instruction and research while the role of less costly graduate assistants and adjunct faculty has steadily grown. Given the probable demographic and financial constraints facing higher education over the next twenty years, we should expect such trends to continue. A projection[2] of the past 12 year instructional trends at USF suggests that by the year 2027 we will find ranked faculty contributing less that 5 percent of USF's total instructional FTE (see Figure 5 and Figure 14). Even future developments in technology-mediated instruction will probably not totally solve the cost problem of educating such a large portion of society. This paper provides evidence, both local and national in support of the preceding theses, suggests probable future directions and makes two recommendations that follow from the trends shown.

The primary issues are international in scope: relatively decreasing money combined with a steady growth in the number of students. These two effects have necessitated changes in the way higher education does business. Cost cutting measures in higher

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[1] At USF, salaries made up 55% of the total 1994/95 E&G budget (RAP, 1995).

[2] Projection linear model fit of $R^2 = .955$. See Technical Addendum for details.

education can involve facilities (including libraries), administration, academics or any combination of these three. Because academic salaries make up such a large portion of a university's total expenses, some budget cuts almost must occur here. At USF, both the total student FTE and the total instructional FTE have increased steadily over the past decade. However, the growth in instructional FTE results almost entirely from large increases in adjunct and graduate teaching assistant (GTA) FTE. Over the same period, USF's ranked faculty FTE has remained almost stable. Between 1983 and 1993, USF showed a 20.2 percent growth of FTE students, and a 48.6 percent growth of FTE graduate students (graduate classroom FTE). During that same period, the FTE of ranked faculty increased by 6.4 percent, of adjunct faculty by 83.5 percent and of graduate assistants (GA) by 186.6 percent. These trends were not local to USF or Florida alone, but represent systematic underlying national trends. Two primary causal factors are:

1. Comparatively less financial support for higher education in the face of increasing competition for funds from corrections, health care and K-12 education[3], and

2. An increasing need for higher education, particularly graduate education, to attain even moderately high-paying jobs.[4]

Aggravating legislative budget-containment tendencies are four recent student FTE trends, each of which effectively reduces the discretionary money available to USF (Micceri, 1994).

1. Proportionally fewer lower-level students.

2. Proportionally fewer non-resident students.

3. Proportionally more upper-level students.

4. Proportionally more graduate students.

As a result of these student and budget trends, the following faculty trends occurred:

1. Proportionally fewer ranked faculty conducted both instructional and research activities.

2. Proportionally more graduate assistants conducted both instructional and research activities.

3. Proportionally more adjunct faculty conducted instructional activities.

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[3] "...government financial support, both state and federal has both shrunk relative to inflation and changed in nature: ." (Postsecondary Education Opportunity, 1995)

[4] "Increasingly...a college degree has become a necessary rather than a sufficient educational credential (for employment)". (Pew, 1995)

Two factors are primary causes of the first two preceding effects:

1. Tightening budgets make it difficult to support ranked faculty salaries.

2. The growth of USF's graduate school makes more graduate assistants available for both research and teaching.

The second factor creates more available graduate assistants which tends to increase the proportion of undergraduate instruction provided by GTAs. Further, in the face of pressure to increase the classroom presence of faculty, the proportion of research effort being handled by graduate assistants (GAs) has also been increasing.

Because similar problems face almost every large U.S. institution of higher education with a graduate program the issue of alternative methods to fulfill instructional and research missions consistently appears in today's academic forums and publications. One currently popular topic is distance education, and, in this area, USF may be considered something of a leader[5]. However, recent distance education SCH trend lines at USF have been relatively flat (Figure 13).

Fulfilling student needs appears the primary issue facing higher education today, because, without students, a university has very little purpose for the general populace. A recent statewide survey of Florida citizens found that about 70 percent of Florida citizens support expending money on higher education to deal with what they perceive to be Florida's #1 problem, crime, while only 30 percent support expending money on jails and police (Sapolsky Research, 1995). This same survey indicates that 50 percent of employers desire courses and programs specifically tailored to their needs. Historically, faculty have almost single-handedly determined curricula. However, in today's customer-oriented society, it appears that input from students, employers and society may become a requirement to retain students, who see an increasing number of higher educational opportunities becoming available each year.[6]

Recent and future technological advances are stimulating changes in higher education. Higher education's traditional lecture/classroom instructional model has exhibited great resistance toward technology-mediated instruction and active learning methods. However, if those who ride the technological band wagon are correct, and the evidence to this date is mixed, then those institutions that do not jump on this wagon fairly quickly may soon find themselves in trouble.

Historically, USF has had an abundant and steadily growing body of prospective students within its largely metropolitan catchment area. Recent technological developments are causing more and more institutions to look at technology-mediated instruction as an alternative to traditional location-bound methods. Certainly distance

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[5] Approximately 30% of US higher education institutions currently use distance education (Twigg, 1995). A survey of 24 metropolitan universities in 1994 showed USF with the greatest total distance education SCH.

[6] Service oriented community colleges (cross-enrollment), distance education from sources other than USF, virtual universities, etc..

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education has grown substantially over the past several years, and with recent developments, technology-mediated education will almost surely change both in range and magnitude. Carol Twigg (Twigg, 1995) suggests that these developments will eliminate the location monopolies that currently support many public universities such as USF. For non-traditional students, fighting the parking problems and coming to class at USF when accounting is being taught may prove both less attractive and more costly than taking the same course at home or at a more convenient time and location from a distant source.

If one accepts the preceding, future expectations are clear:

- The absolute numbers of students will increase substantially.
- The costs of educating an increasingly greater portion of the population will prove simply too great for society to support using the historic higher education instructional method which employs highly trained and specialized ranked faculty. Therefore, such faculty will increasingly emphasize higher levels (e.g. graduate programs), while less specialized, but considerably less costly graduate assistants and adjuncts will continue to increase their portion of undergraduate instruction at research universities.
- Competition for students will become worldwide, as technologically enhanced communications systems and information transfer methods make higher education available away from a university's brick and mortar structures.

The absolute numbers of ranked faculty may actually increase, because the type of specialized expertise they hold will continue to prove very beneficial to society. However, over time, these costly resources will almost surely make up an increasingly smaller part of the higher education totality.

Figures and Tables

Figure 1 and 2

Historic Student Trends and Their Financial Implications

As noted in the Overview, universities nationwide have experienced relatively less funding over the past decade (Postsecondary Education Opportunity, 1995). The figures discussed here graphically depict two other trends that have had negative financial effects both at USF and nationwide.

Figure 1 shows changes in the type of student FTE at USF from 1989/90 to 1993/94. In these graphs, "hypothetical" students represent the FTE we would have had if the proportions of students at the four levels (lower, upper, graduate classroom, thesis) had remained the same as they were in 1989. Panel A, Figure 1 shows how

actual upper-level undergraduate FTE has climbed above hypothetical FTE levels, while actual lower-level FTE has dropped below hypothetical lower-level FTE. This drop in lower-level students resulted partly from the nationwide drop in the number of high school graduates over the past several years and partly from an increasing use of community colleges as a path to 4-year degree programs (Micceri, 1995).

Panel B shows that actual graduate classroom FTE has climbed above hypothetical levels while actual thesis/dissertation FTE has remained at about the same level as hypothetical FTE over the time depicted.

Unfortunately, these trends at both the graduate and undergraduate levels cost USF money. Due to the costs of instruction and the amount of income received by USF from the state of Florida and tuition, USF's most profitable student FTE are thesis/dissertation and lower-level undergraduate. Upper-level undergraduate is at best a break-even situation, and each graduate classroom FTE results in a net cost to USF (Micceri, 1994).

Figure 2 shows the recent drops in non-resident FTE at USF. Panel A shows that while undergraduate and graduate resident proportions of student FTE have grown over the past several years, undergraduate non-resident FTE has dropped substantially, while graduate non-resident FTE has remained relatively stable. Panel B shows the precipitous recent drop in USF's total non-resident student FTE.

The net effect of these student FTE trends is substantial. Had all student FTE proportions remained the same in 1993/94 as they were in 1989/90 with the same total student FTE in 1993/94, this would have put a net of approximately $3 million above costs into USF's coffers.[7] The recent drop in high school graduates and the increasing use of community colleges is national in scope, thus lower-level FTE (the least costly FTE to produce) has dropped proportionally. Regarding non-residents, all 15 public institutions who responded to an informal internet survey two years ago indicated that their proportions of non-resident students had either dropped or at best remained relatively stable in the 1990s. We may therefore assume that a tight economy is a factor in the non-resident trend.

Figures 3 to 8

Faculty Instructional and Research Trends and Student FTE Trends

As noted above, the combination of legislative budget-cutting fervor and increasing student demand for higher education has put a "squeeze" on higher education in general and USF in particular.

Figure 3 shows the 10-year growth among the three types of faculty FTE and student FTE at USF. Panel A shows total faculty FTE and Panel B, instructional faculty FTE.

[7] Based on 1993/94 cost and income estimates.

Figure 1
A Comparison of USF's Actual FTE with Hypothetical FTE Generated by Applying 1989 Student FTE Proportions to Later Year's Data

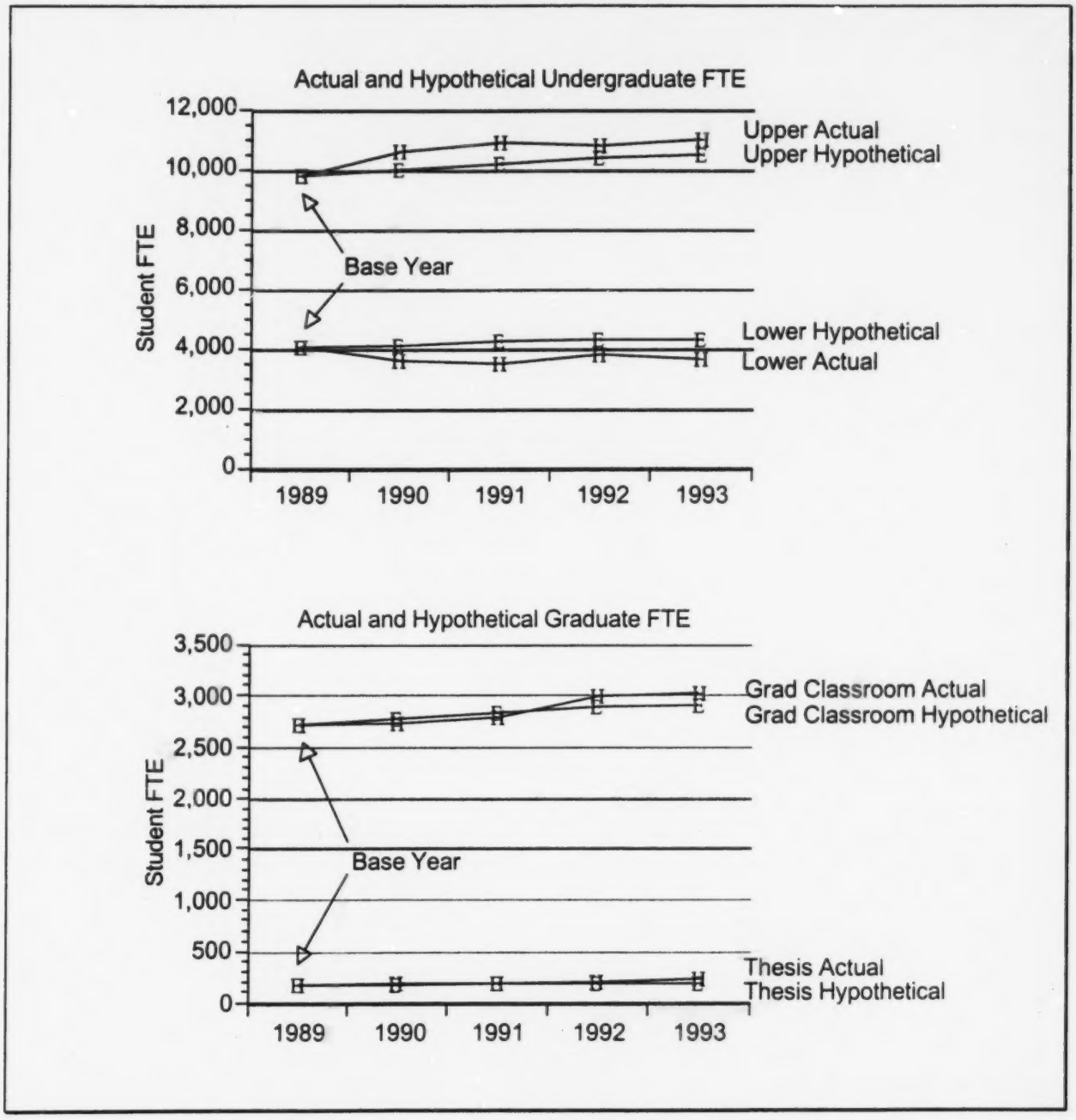
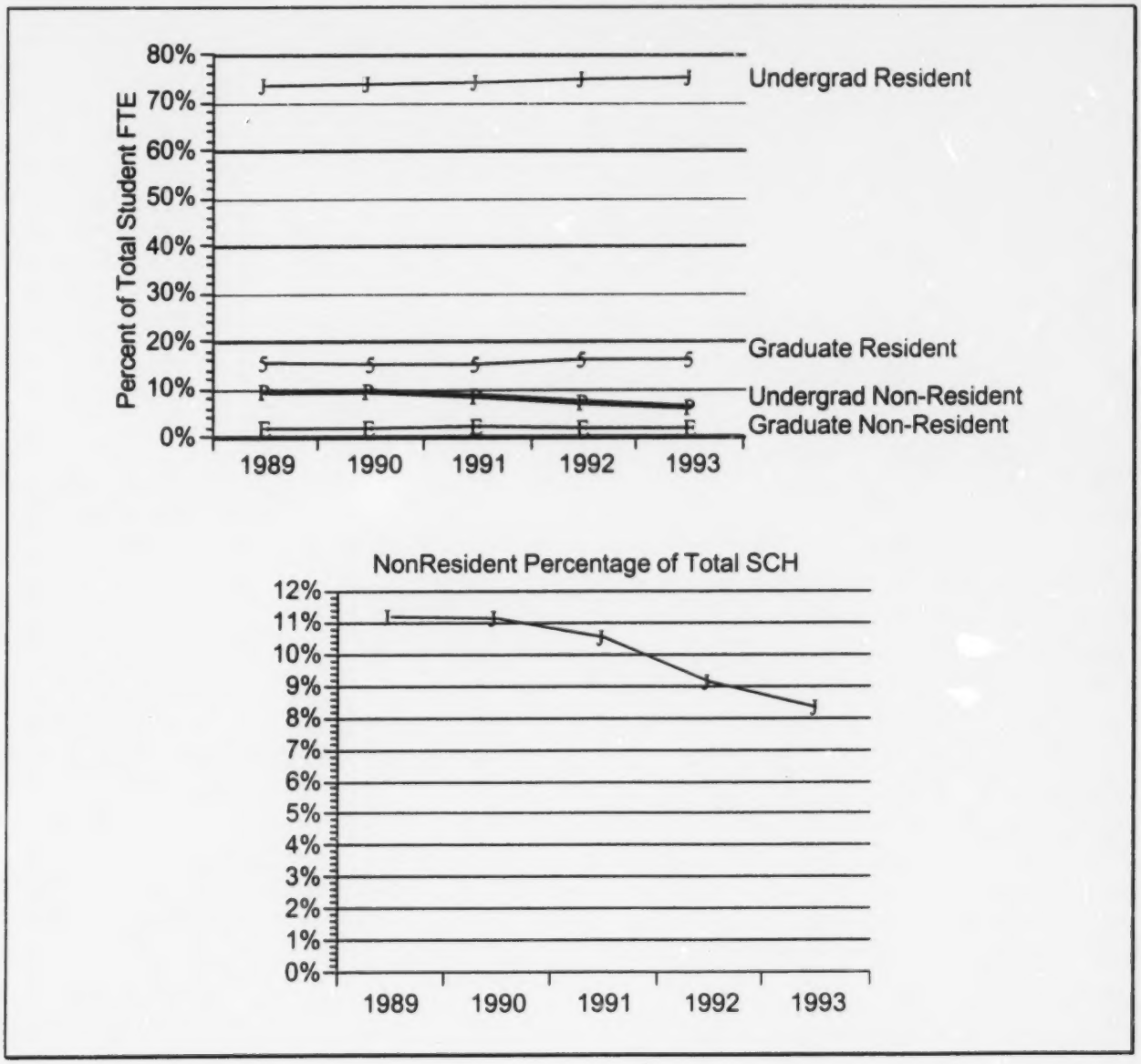


Figure 2
USF Historic Resident and Non-Resident FTE Trends



While ranked faculty FTE increased only 6.4 percent from 1983 to 1993, adjunct FTE increased by 83.5 percent and graduate assistant (GA) FTE by 186.6 percent. This resulted partly from the increase in the absolute number of graduate students at USF during this time (50 percent increase), but also resulted from a need to handle more total students with very little inflation-adjusted funding increases.

The trends reported here are not limited to USF. Figure 4, Panel A shows historic data for Penn State University regarding growth in the number of students and ranked faculty. In their *Report of The Special Commission on Faculty Workload and Accomplishment* (1994), the authors note: "A 9 percent increase in the size of the full-time faculty over the past fifteen years (through 1993) did not nearly keep pace with the growth in workload. Undergraduate enrollments were up 15 percent, graduate enrollments were up 65 percent..." (p. 2).

Similar trends occur nationwide. Panel B shows increases in the numbers of students (both graduate and total) and faculty at three different sets of institutions from 1983 to 1993.[8] These data represent 45 Research I universities, 27 Research II universities and 24 universities that are members of MUG (The Metropolitan University Group, see Technical Appendix for details). The percentages represent the median within each group. For all three sets, graduate students showed the greatest increases while faculty tended to show the smallest increases during this period. This difference between the increases of faculty and graduate students is particularly acute for the MUG group, perhaps because universities such as these are growing more rapidly than the more established Research I universities (Six universities are both Research I and MUG.).

Graduate students require more intense efforts from university faculty than undergraduates. Thus, these large relative increases in graduate students put pressure on a university's ability to handle student requirements, unless they are matched by approximately equal increases in faculty. Obviously, the last effect has not occurred locally, and these data suggest that similar phenomena are occurring for many large universities. At USF, these trends have resulted in steady reductions in the proportion of both instruction and research handled by faculty.

Panel A, Figure 5 shows the 10 year trend of USF's Instructional FTE[9], while panel B, Figure 5 shows this for USF's research FTE. Whereas ranked faculty accounted for 72 percent of USF's instructional FTE in 1983/84, they only accounted for 57 percent in 1994/95. Growth among adjuncts in both research and instructional FTE was moderate during this time, while growth among graduate assistants was great (from 13% to 27% of total instructional FTE and from 18% to 37% of total research FTE). Again, this partly resulted from the 50 percent growth in USF's total graduate student FTE over this same period.

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[8] The reported data came from CASPAR databases - source IPEDS.

[9] Note that estimates prior to 1988/89 resulted from taking 1988/89 proportions of effort and applying them to preceding years' FTEs.

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This trend has been so consistent that conducting a regression of time to FTE produced a linear model R^2 fit of .955 for instructional FTE and .967 for research FTE. Extending these models results in a prediction that ranked faculty will produce less than 5 percent of the instructional FTE and less than 7 percent of the research FTE at USF by the year 2027 (see the Technical Appendix for details).

Figure 6 shows that while adjuncts and GTAs generate considerable undergraduate SCH (particularly lower-level SCH), ranked faculty generate almost all graduate SCH, except for about 14 percent of graduate classroom SCH which is attributable to adjunct professors. Between 1988/89 and 1993/94, ranked faculty lower-level SCH production dropped from 59 percent to 37 percent of total, while upper-level SCH production dropped from 78 percent to 63 percent of total. During this period their graduate classroom SCH production dropped from 88 percent to 86 percent. Ranked faculty have clearly emphasized higher-level instructional activities as their numbers have dropped relative to students.

Panel A, Figure 7 breaks faculty activity during the 1993/94 academic year into its primary functions. Instructional activity makes up the greatest portion of faculty FTE, with research and academic administration being relatively distant seconds and thirds respectively.

Panel B, Figure 7 shows that by far the greatest portion of USF's faculty instructional FTE is dedicated to upper-level undergraduate instruction. Lower-level undergraduate instruction receives less total FTE allocation than the combined graduate environment (classroom and thesis/dissertation).

Figure 8 compares USF reported percentages of work week to national data for Public Research Universities (U.S. Department of Education, 1990). USF faculty report somewhat more teaching and somewhat less research effort (Fall, 1993) than does the "average" faculty member at such Public Research Institutions.

Figures 9 to 12

Differential Costs as an Explanation for Faculty Trends

The figures in the preceding section clearly show the trend of increasing adjunct and graduate assistant involvement in both instruction and research at USF. Although this trend results partly from the growth of USF's graduate school, another cause is the comparatively high cost of ranked instructional faculty as the data in this section shows.

Panel A, Figure 9 shows the cost per SCH in faculty salaries[10] for the total university and each major college separately (1993/94 year). Clearly, the cost per SCH

[10] Salaries include benefit costs, and only the instructional percentage of FTE was used to compute these estimates.

Figure 3
USF Historic Faculty and Student Trends

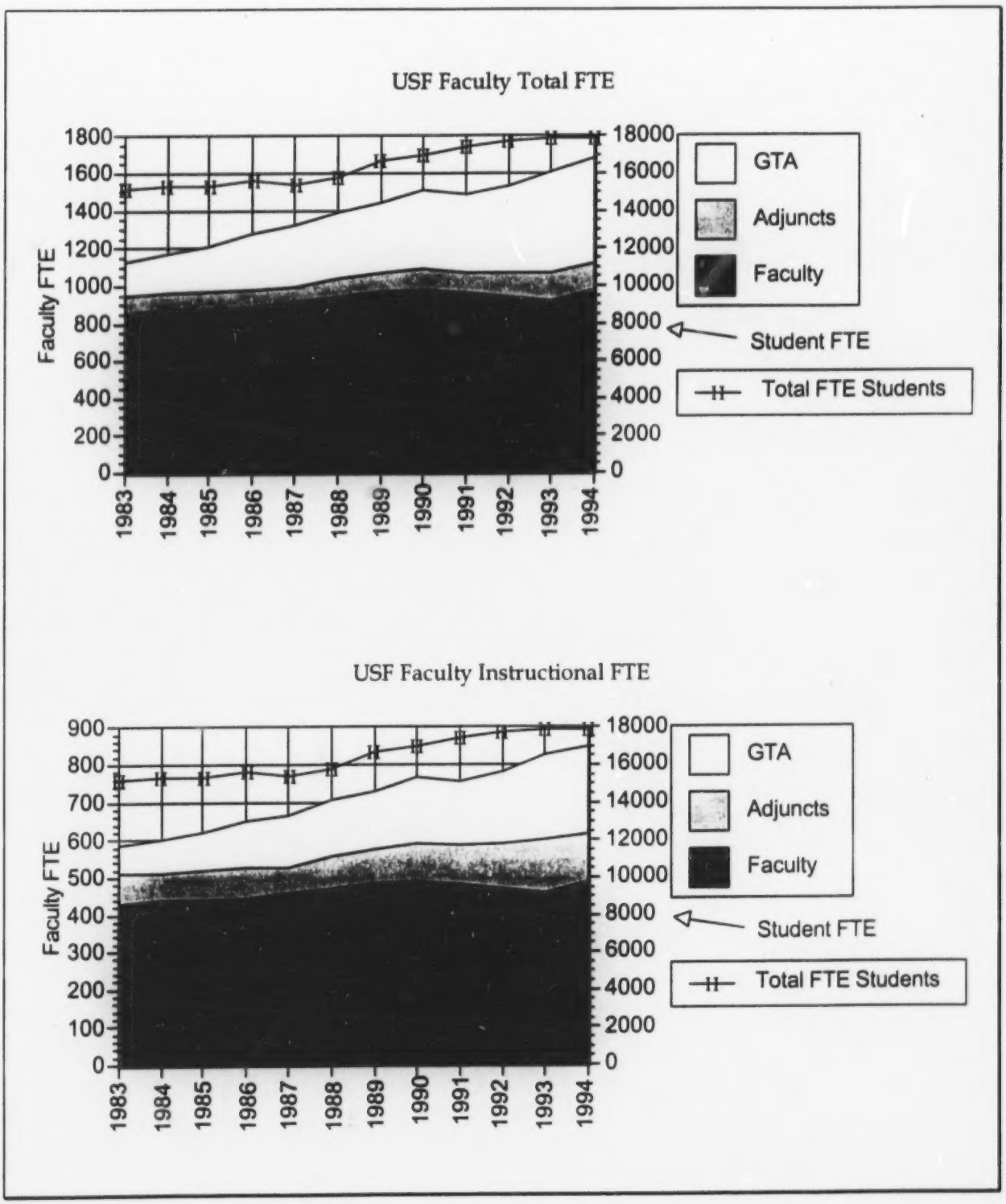


Figure 4
Historic Student and Ranked Faculty Trends: Panel A - Penn State University; Panel B - National 11 Year Changes at Three Sets of Universities

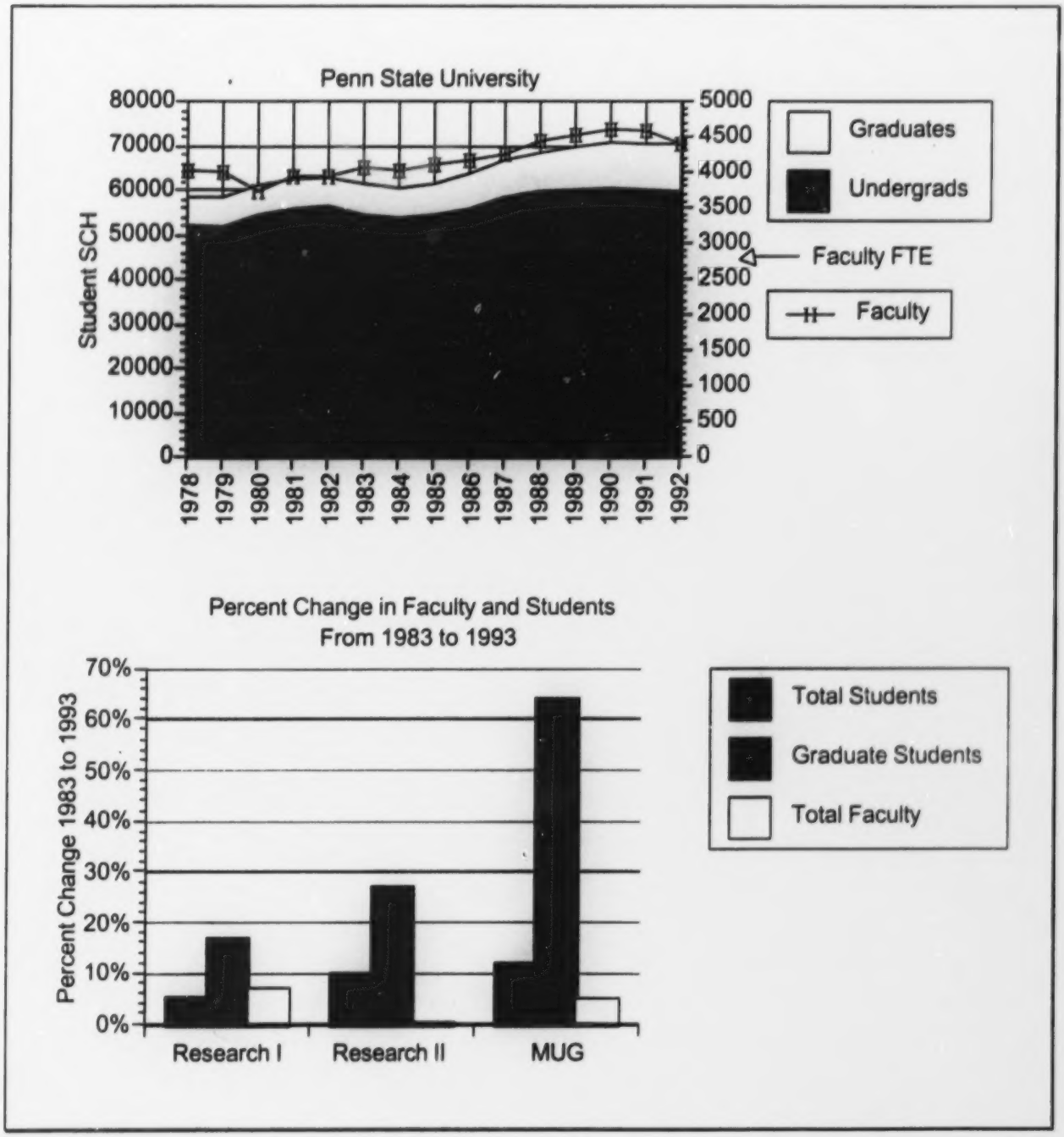


Figure 5
USF Historic Percentages of Instructional and Research FTE by Faculty Type

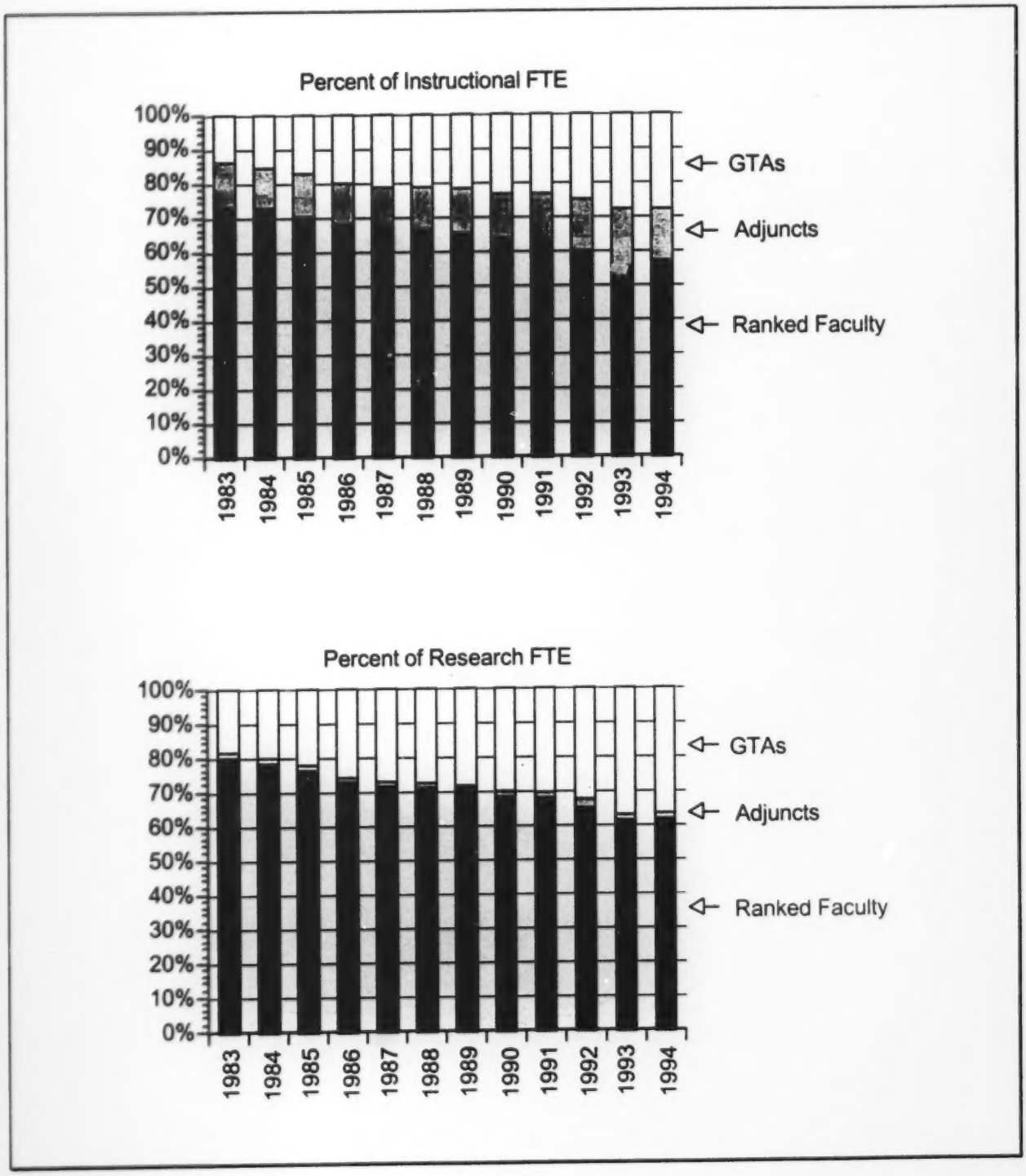


Figure 6
SCH Production by Faculty Type From 1988/89 to 1993/94

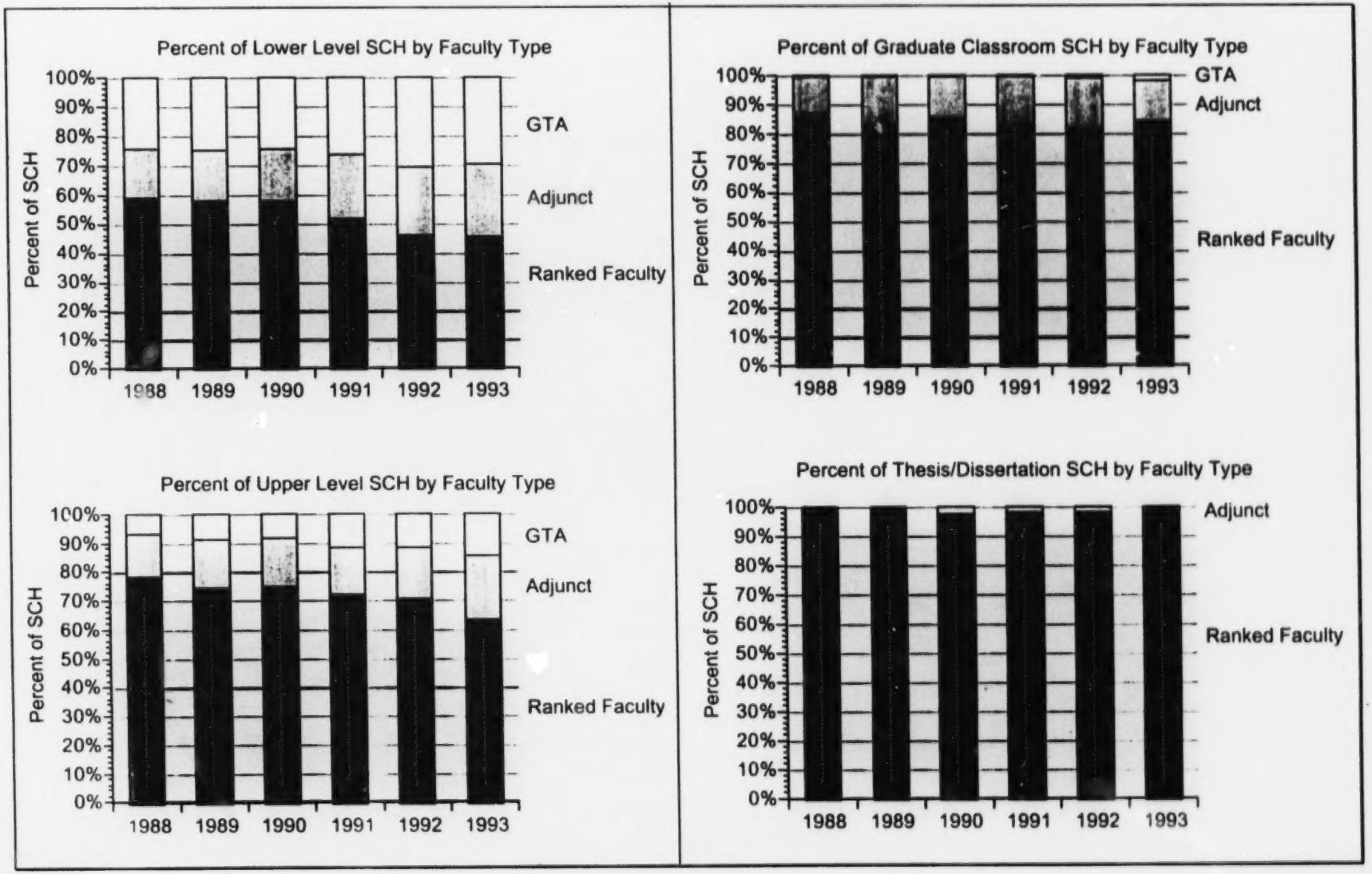
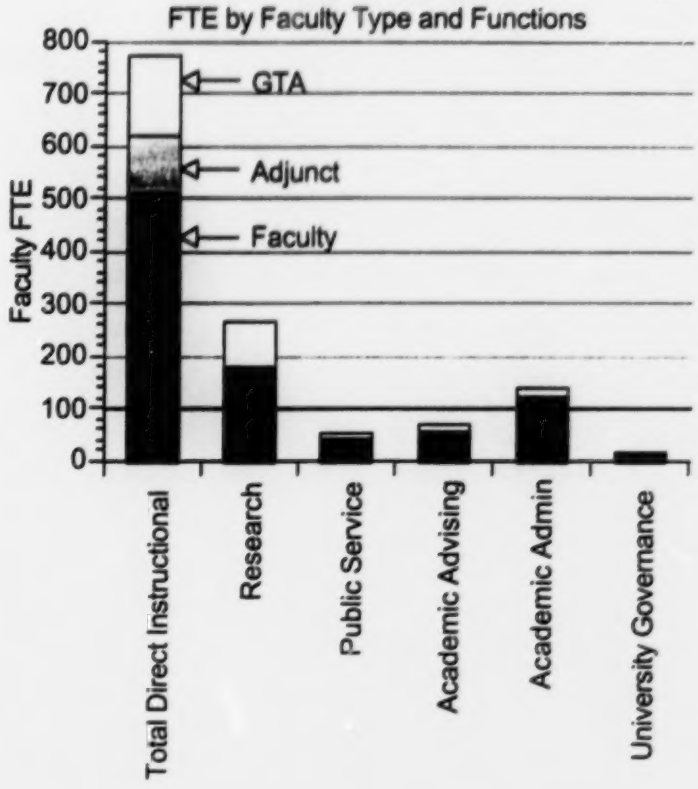


Figure 7
USF 1993 FTE by Faculty Type



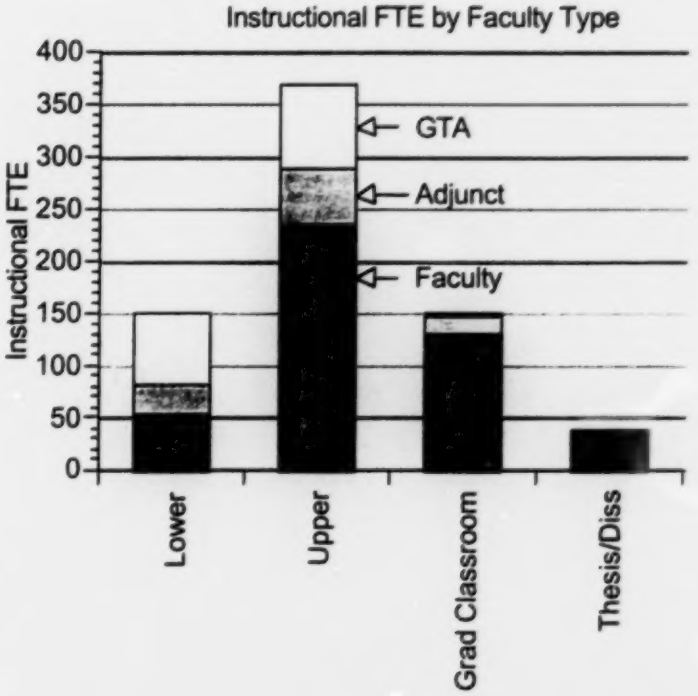
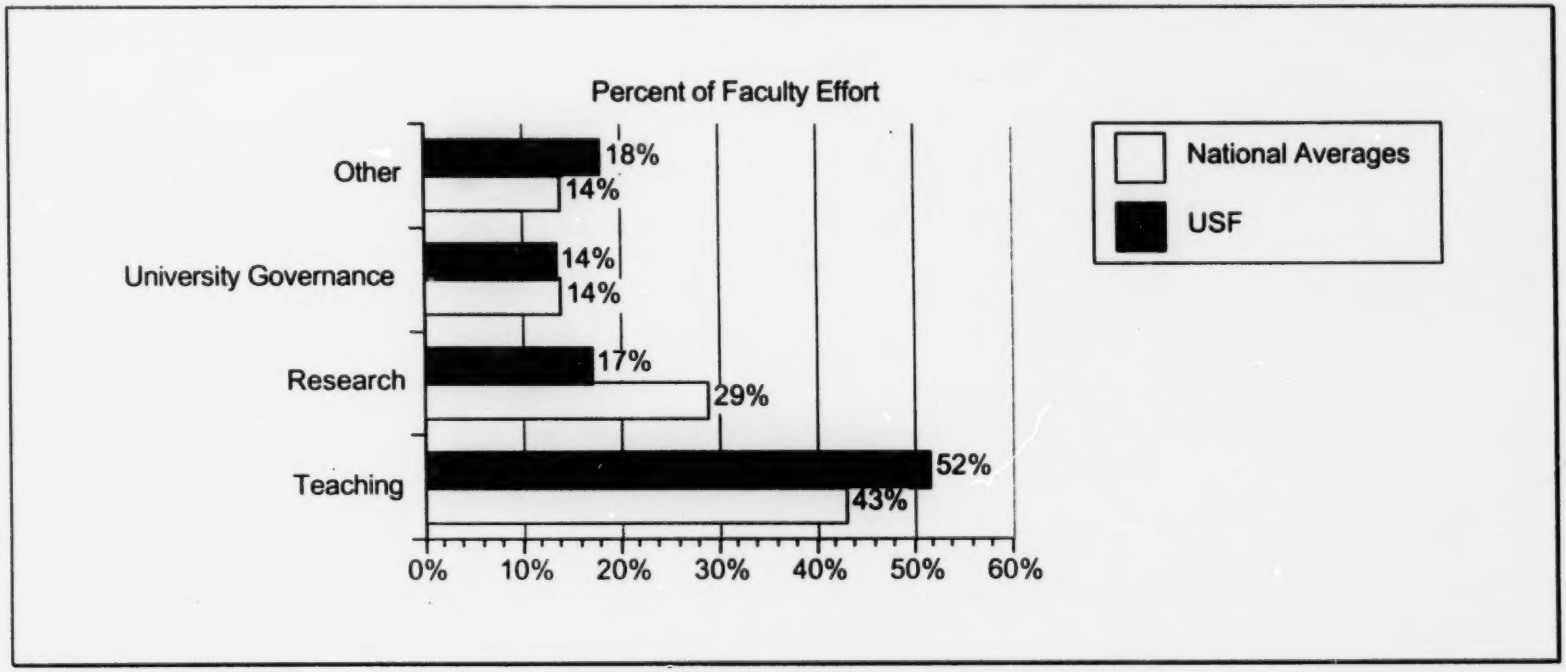


Figure 8
A Comparison of USF Faculty Allocation of Effort with National Averages



generated by ranked faculty is substantially higher than that of either adjuncts or GTAs for all colleges. This occurs partly because faculty teach more higher level courses, including thesis/dissertation work which results in smaller class section size and fewer SCH per section.

Panel B, Figure 9 shows the proportion of student SCH generated by the different instructional personnel in the major colleges. Clearly, Arts and Sciences and Engineering make the most use of GTAs, while Education uses the greatest proportion of adjuncts. Only in Arts and Sciences do GTAs and adjuncts produce more than 30 percent of the total student SCH. Despite having the highest faculty salaries, the second highest faculty generated proportion of student SCH (behind only Fine Arts) and a good-sized graduate program, Panel A shows that the College of Business Administration has the lowest cost per SCH among ranked faculty. This indicates that the classes taught by ranked faculty in the College of Business Administration tend to be larger than in other colleges. This is certainly true relative to Fine Arts, which, despite having the lowest salaries, has the greatest cost for faculty-generated student SCH primarily because of their typically small classes.[11]

Figure 10 shows recent changes in the cost per SCH among the three groups (between 1988 and 1993). Over this period, adjunct and GTA cost per SCH have increased approximately 10 percent, while ranked faculty costs per SCH increased by 42 percent. Because an increasingly greater proportion of USF's student SCH is being generated by GTAs and adjuncts, the total "faculty salary" cost per SCH increased by only 26 percent.

Figure 11 suggests a possible reason for the rather large increase in cost per faculty SCH from 1988/89 to 1993/94. Panel A shows the mean number of student SCH produced by each faculty FTE for the average of the Spring and Fall semesters for each type of instructional faculty. Clearly, adjunct faculty produce a greater number of SCH per instructional FTE than either ranked faculty or GTAs. Further, it appears from the graph that the relative SCH production of adjunct faculty has increased between 1988/89 and 1993/94, as shown by the relatively greater height of the adjunct column for 1993/94. During 1993/94, the mean SCH university-wide produced by adjunct faculty was 460, very similar to their 1988/89 mean of 454 SCH per instructional FTE. During that same time, GTA SCH per instructional FTE also remained quite level going from 267 to 276. However, over that period, ranked faculty SCH per instructional FTE dropped almost 20 percent, from 365 to 301.

Panel B may offer a partial explanation for this phenomenon among ranked faculty. From 1988/89 to 1990/91, the percent of effort reported by ranked faculty as devoted to instruction remained relatively constant at about 36 percent (read on right vertical axis). However, between 1990/91 and 1991/92 this reported percentage jumped to about 50 percent, at or above which point it has remained. We

[11] Faculty in USF's College of Fine Arts teach more sections than faculty in any other college, however, these sections tend to be far smaller than those in other colleges (Micceri, Waugh & Loduca, 1994).

can see that the faculty SCH per instructional FTE also remained quite constant from 1988/89 to 1990/91, increasing a bit during that time, from 365 to 377. However, a steady drop occurred between 1990/91 and 1993/94. This drop probably results from some combination of the following causes:

- faculty teaching smaller classes, or
- faculty teaching more graduate courses, or
- faculty increasing reported instructional activities, without an accompanying increase in the SCH generated by this increased instruction.

We should note that from 1990/91 to 1991/92, both adjunct and graduate assistant proportions of effort applied to direct instruction also increased, however, as Panel A shows, their SCH per instructional FTE did not exhibit a similar decline.

Clearly, comparing ranked faculty costs to those of adjuncts and GTAs is like comparing apples and oranges, because of the intense requirements on faculty that graduate education generates. Figure 12 attempts to compare the costs of apples with apples by limiting comparisons across groups (faculty, adjuncts, GTAs) to lower and upper-level costs per SCH for each instructional dollar spent. Probably the most stable and accurate estimate here is for upper-level SCH, because all three groups exert considerable effort at this level, and the sample is also far larger than for lower-level SCH.

- At the upper-level, the average faculty generated student SCH costs 3 times as much as the average GTA-generated student SCH and 2.6 times as much as the average adjunct-generated student SCH.
- These differences drop for lower-level SCH, however, it is still more than twice as expensive to have a faculty member generate an SCH as it is to have either an adjunct or GTA.

Again, we should expect that ranked faculty tend to teach the smaller, more specialized courses at all levels, which accounts for some of the differences in costs. Further, estimates of cost at all levels are based on an average ranked faculty member, whereas we should expect that the more expensive Full professors will tend to teach at higher levels. We should therefore expect the lower-level faculty cost estimates to be a somewhat higher than truth (perhaps as much as 15-25%). However, we should expect the mix of faculty FTE at the upper-level to represent fairly well the total university-wide "average" mix of Assistant, Associate and Full professors used to compute the cost estimates. Note that the cost differences per SCH between lower-level and upper-level for faculty result from the larger classes a the lower-level.

Figure 9
Costs and Generation of Student SCH by Faculty Type Across USF's Major Colleges

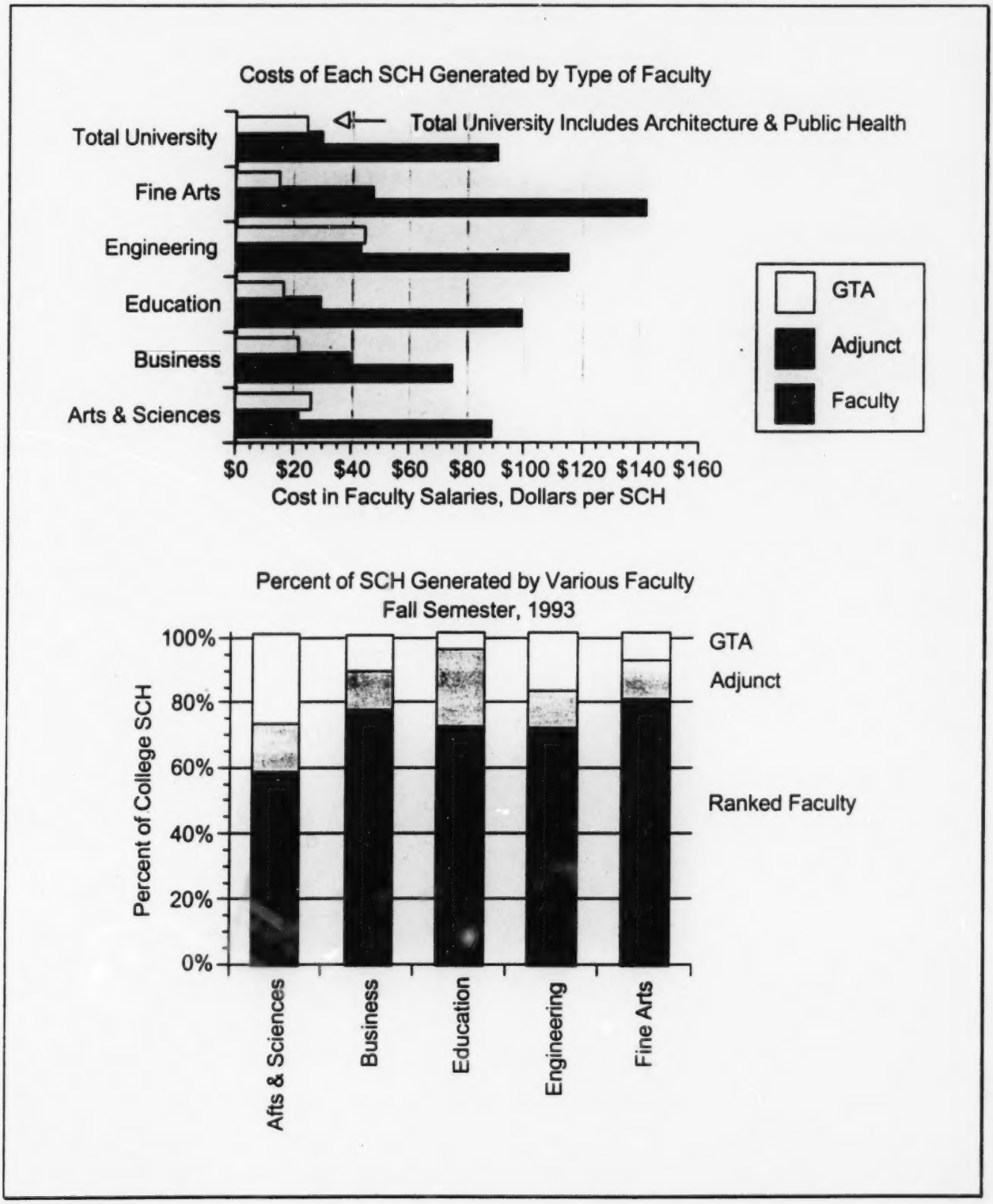


Figure 10
Cost Increases Per Student SCH for Different Faculty from 1988 to 1993

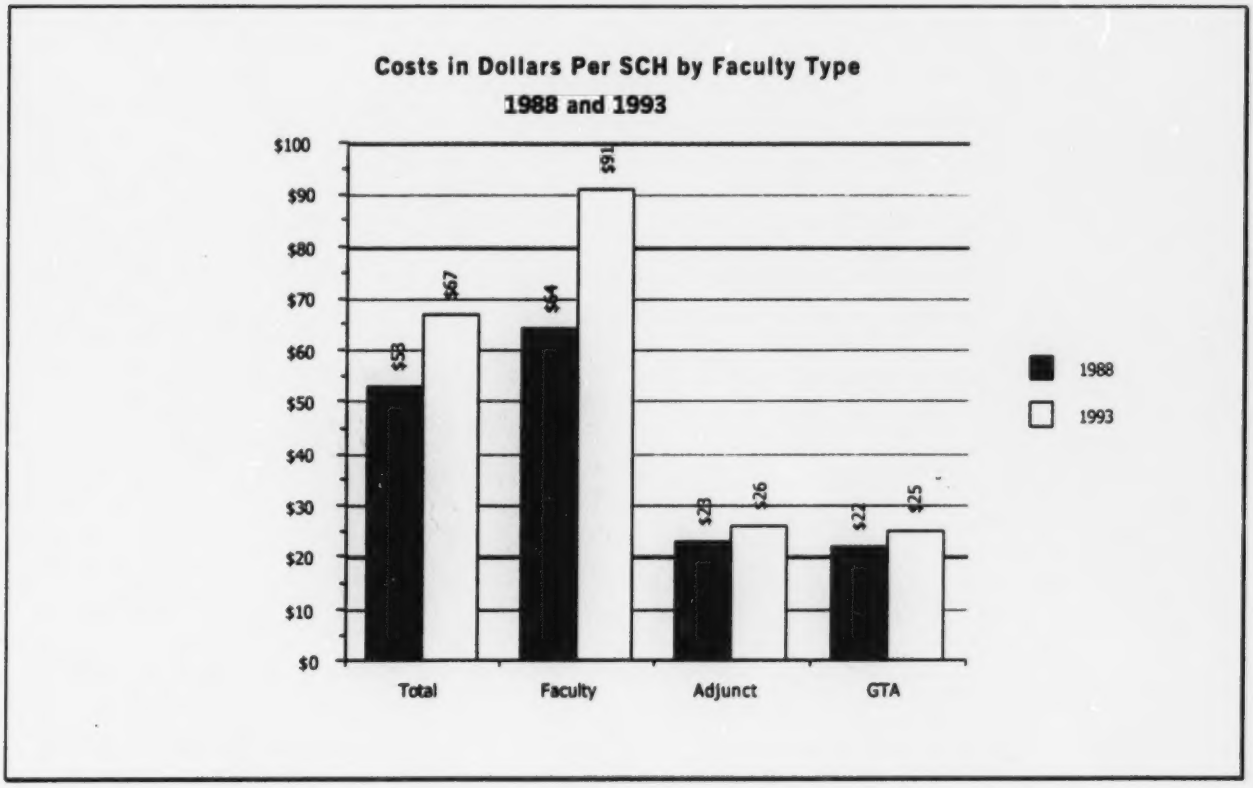
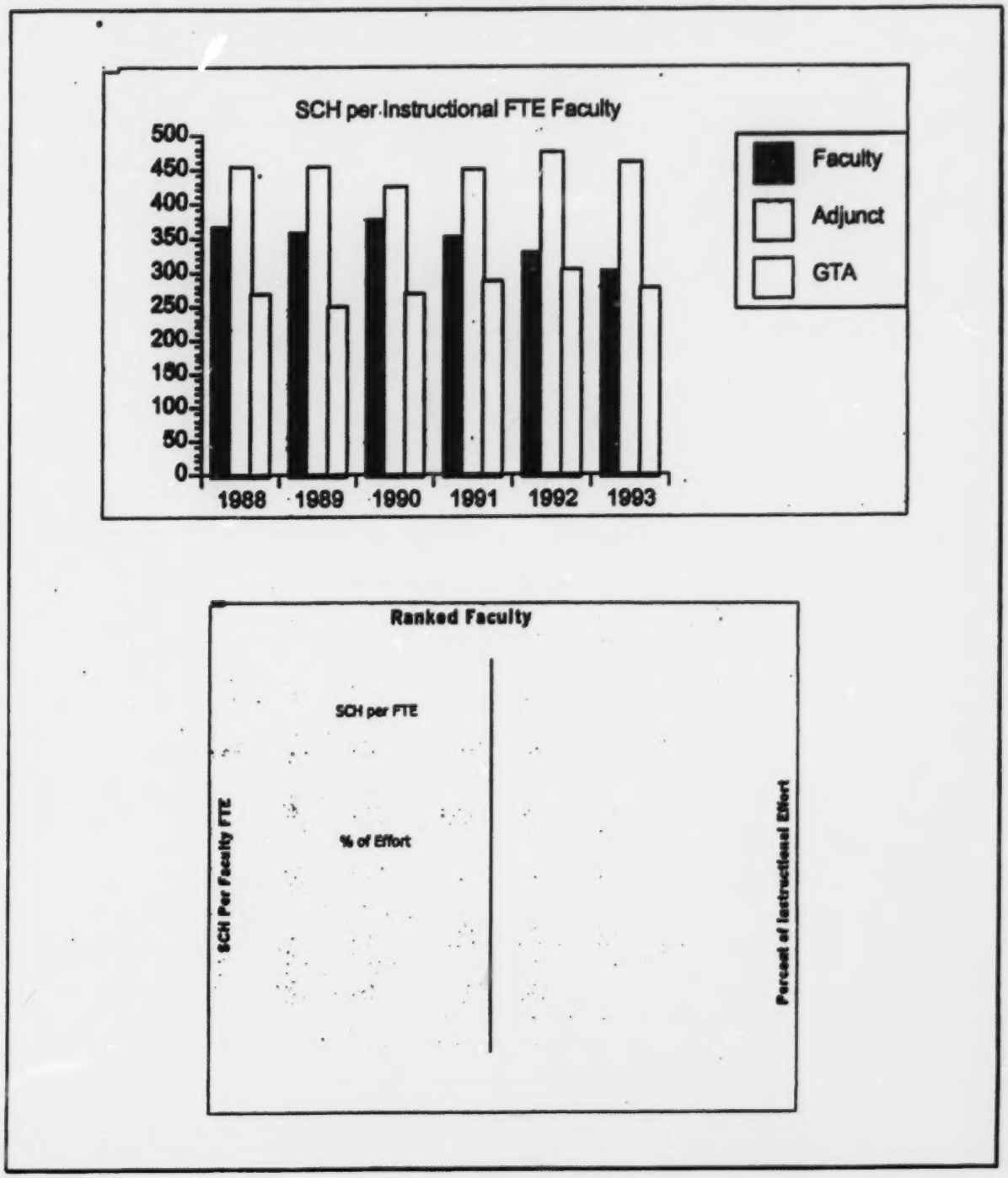


Figure 11
Student SCH Per Faculty FTE Per Semester and
Its Relationship to Proportion of Effort Devoted to Instruction



The preceding shows how much more expensive it is to have ranked faculty tender instruction than either adjuncts or GTAs, particularly for the upper-level undergraduate student. Estimates for 1993/94 suggest that if ranked faculty were to replace all adjuncts and GTAs at the undergraduate level, this would require approximately 25 percent more ranked faculty instructional FTE salary and benefit costs above the already occurring cost for adjuncts and GTAs at those instructional levels. This 25 percent estimate assumes that ranked faculty will generate the same quantity of SCH per instructional FTE as adjuncts and GTAs.

Figure 13

Historic Distance Education Headcounts at USF

Figure 13 shows distance education headcounts at USF over the past ten years. Clearly, FEEDS experienced a steady growth until about 1992/93. However, since that time, the number of heads has remained relatively steady. Media Productions' headcounts[12] also have been relatively flat from 1992/93 to the present. Note that the drop from 1991/92 to 1992/93 for Media Productions reflects the elimination of an extremely popular course.

Conclusions and Recommendations

The data represented above clearly show that changes are occurring in the relationship between faculty and students both locally and nationally. As noted earlier, if we extend a line projecting USF's faculty proportion of instructional activity into the future from the data in Figure 5 (Panel A, see also Figure 14 in the Technical Addendum), by the year 2027, USF will have less than 5 percent of its instructional FTE produced by ranked faculty.

Today's shrinking economic fabric[13] and rapidly changing social and technological environment imply that traditional higher education instructional methodologies may not survive much longer at the undergraduate level as they have existed over the past 500 years. Putting more pressure on tradition are suggestions from such as those of Educom's Dr. Carol Twigg that the risks technology may introduce during this time of change could be great, because, as technology-mediated instruction develops and becomes more and more widely available, this may eliminate the location monopolies that many universities currently enjoy (Twigg, 1995).

The cost information reported above indicates that the 9-15 year post-baccalaureate apprenticeship required before a tenured faculty member can profess from her lectern is simply too costly a process for today's widespread higher education. With the recent growth in graduate education, these prized ranked faculty are being called more and more to dedicate their time to these higher-level students. Spreading such faculty more widely with the help of qualified assistants (adjuncts and GTAs) or through distance

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[12] Data from Media Productions was not available prior to the Spring Semester, 1990/91.

[13] Inflation-adjusted median family incomes dropped from $37,136 in 1979 to $36,812 in 1992 (Barlett, 1994)

Figure 12
Costs Per Student SCH by Faculty Type for Lower-Level and Upper-Level Undergraduates

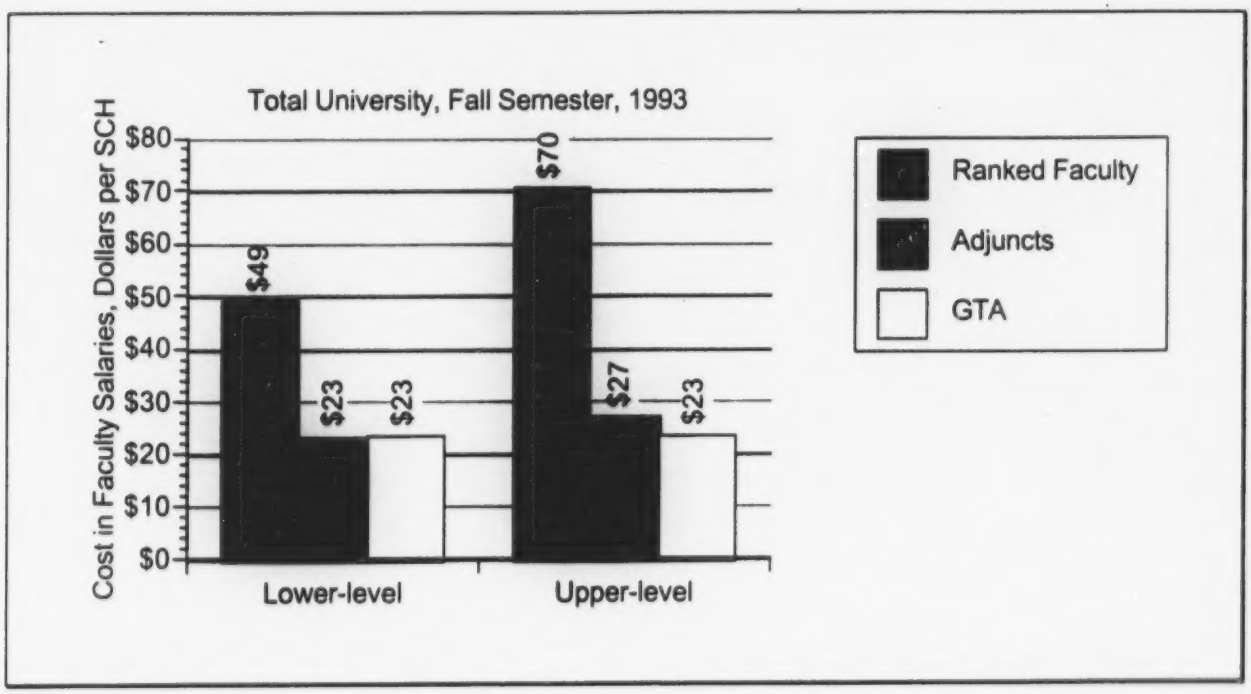
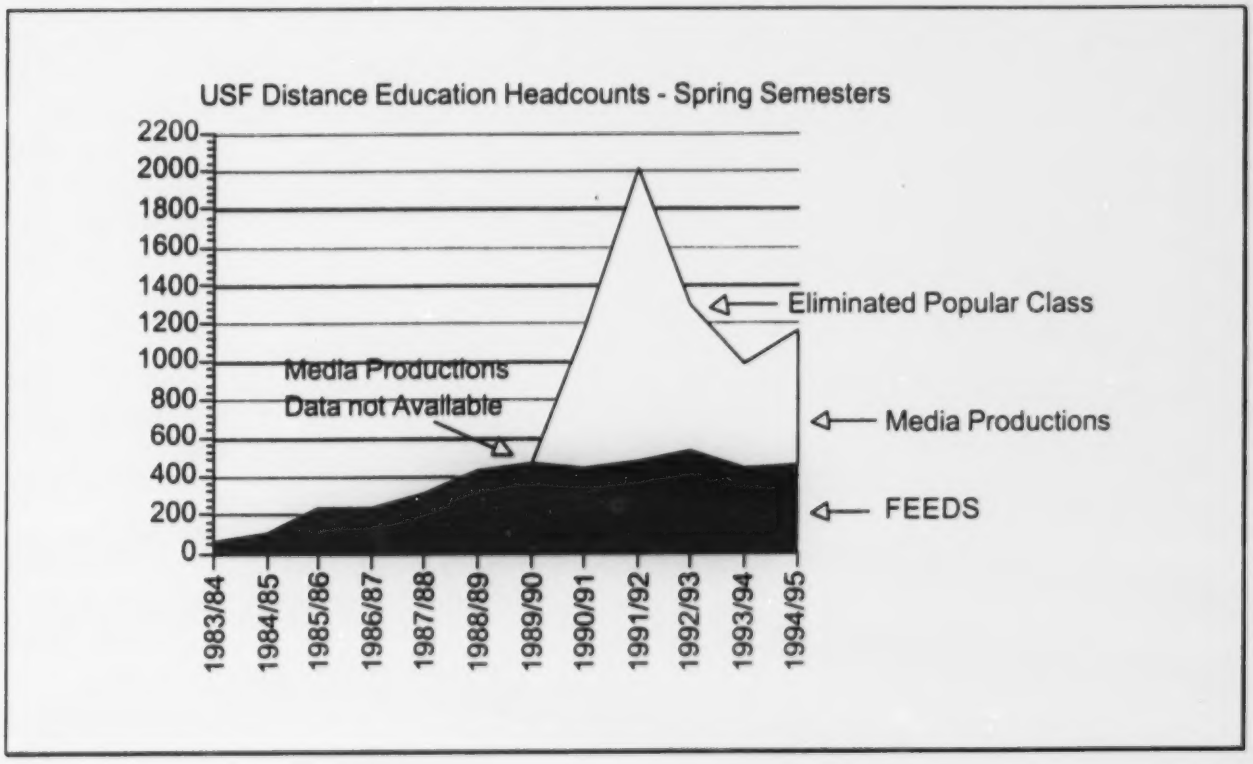


Figure 13
Historic Distance Education Headcounts at USF for Spring Semesters



education will offer some help, but these also are costly processes. Community colleges have experienced exponential growth over the past 30 years as a less-costly alternative to four-year universities.[14] Historic data at USF (Figure 5, Figure 6, Figure 14) provides further evidence of this trend toward using less costly instructional faculty for all but graduate education.

Since 1973, U.S. universities have been graduating doctors (4-year post-baccalaureate apprentices) at the rate of over 30,000 per year. The 1993 total was 39,754 (Thurgood & Clarke, 1995), of whom only a small portion obtain work as tenure-earning faculty. It appears that the number of "qualified" instructors for higher education purposes are extensive if one includes these individuals. The qualified, part-time (or full-time) adjunct, teaching in an area of specialty and acting as a mediator between active students and the information/decision methods they need to prepare for life in the information age will probably be the instructor of the future for many undergraduate students.

[14] From 1984 to 1993, 2-year colleges experienced more than twice (22.9% to 11.1%) the undergraduate growth of 4-year institutions (Barbett, Hollins, Korb, & Morgan, 1995).

Recommendations

- Put first priority for the use of Associate professors and especially Full professors to teach at the graduate and for specific upper-level undergraduate courses. Such faculty should probably be used only for "cameo" appearances in lower-level courses.

- Although GTAs will probably continue to show greater increases than adjuncts over the next several years, putting extra resources into them for instructional purposes is somewhat self-defeating, because they are "here today and gone tomorrow." This is not always true, however, because many of USF's former graduate students become adjuncts after graduation. Further, because adjuncts tend to work at doing in the "real world" what they teach in the classroom, they sometimes are more aware of undergraduate student needs than research-oriented faculty. They should therefore be considered a valued resource by USF, particularly for undergraduate instruction; and we sould realize that putting more resources into this group could prove quite valuable, both for the university and its students. We might therefore investigate the possibilities of recurring or long-term part-time and full-time adjunct contracts for individuals who fulfill specific requirements, one example of which might be instructional training such as that currently required at USF for GTAs. In fact, one might consider the type of multi-year, non-tenure-earning contracts that the future Florida Gulf Coast University is currently considering to be part of the push in this direction.

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Technical Addendum

IRP Analytical Report 9506.1

Using Regression Analysis to Project Future Faculty FTE

Based on the data from Figure 5 on Faculty Percentages of Instructional and Research Effort from 1983 to 1994, a regression model was applied using time as the independent x variable (measured in years from 1 to 12 with 1983 being year 1 and 1994 being year 12) and respectively, faculty percentage of instructional and research FTE as the dependent y variable. The linear fit of time to percentage of faculty FTE produced significant fits of $R^2 = .955$ for instructional FTE and $R^2 = .967$ for research FTE. Applying the linear model to future years results in an estimate of instructional FTE percentage of .046 and for research FTE of .07 at the year 2027. This is obviously an absurd model to apply, because limits must influence these trends, however, for rhetorical purposes it serves as an indicator of the consistency of these downward trends in instructional and research FTE among ranked faculty. Figure 14 shows the match of the fitted line with faculty FTE percentages over the 12-year period from which it was developed.

Data Sources, Computational Methods and Limitations

The primary purpose of these analyses were to provide indications of data trends. Much of the data reported, therefore consists of best-guess estimates. Specific methods applied to the data analyses and sources for various estimates are identified here.

Data regarding faculty (ranked, adjunct & GTA) salaries, SCH generation, and instructional proportions from 1988/89 to 1993/94 came from production run report IRAO4900 which comes from IRDF files. Historic data prior to 1988/89 came from historic USF Fact Books.

Data on Distance Education came from the FEEDS and Media Productions offices.

Computations using the IRDF data were limited to Fall and Spring semesters. Thus, data for the year 1988/89 represent the Fall semester 1988 and the Spring semester 1989. Data from Summer semesters were not included for two reasons:

- Summer semesters represent a small portion of instructional activity at USF, and
- Summer semester faculty activities differ substantially from Fall and Spring.

When computing proportions of instructional and research FTE (Figure 5), proportions of effort applied to the to the eight E&G categories of direct instruction (lower-level, upper-level, graduate classroom, other instructional effort, thesis/dissertation supervision, directed independent studies, supervision of interns, and supervision of teaching) were totaled. These proportions were then multiplied times total FTE for each group (ranked faculty, adjuncts and graduate assistants) to come up with a total for instructional FTE. The proportions of this total generated by each group was then

computed. The same method was applied for research effort estimates. For years prior to 1988/89, the percentage from 1988/89 (which was quite similar to those of 1989/90 and 1990/91) was applied to FTE

totals for each group back to 1983/84 and from this was computed the proportion of total instructional and research FTE for each group.

When computing SCH by level and faculty type and costs per SCH (Figure 6), SCH from each level (lower-level, upper-level, graduate classroom and thesis/dissertation) were used separately to develop estimates. To estimate costs, the proportion of effort applied by the type of faculty to each level was multiplied times the total salary dollars (including benefits) for each type of faculty and then divided by the total SCH generated at that level by that faculty type (Figures 9 to 12).

When computing Faculty FTE by functions (Figure 7), only data from the Fall semester 1993 was included. From the percentages of effort, total FTE for each activity and instructional level was computed separately, then multiplied times total FTE for the faculty group.

When computing the discretionary dollars that would be available to USF had 1989 proportions of student FTE enrolled in 1993, the dollars in cost per average FTE by level (lower, upper, grad classroom, thesis) were subtracted from the total income per FTE (by level and residency from tuition and state dollars per new student), then multiplied by the differences between hypothetical student FTE (if proportions had stayed the same as 1989) and actual student FTE. Note that the new student data is appropriate here, because the differences result from "growth", or lack thereof.

Cost estimates per faculty generated SCH represent some problems. First, research-oriented faculty generally tend to have somewhat higher pay than teaching-oriented faculty. Second, we should expect lower-level estimates for ranked faculty to be somewhat high, because it is more likely that Assistant and Associate professors teach those courses than full professors, and full professor salaries tend to be substantially above those of either Assistants or Associate professors (in 1994, regression estimates from the Salary Equity study suggest that the average full professor receives a salary approximately $19,000 higher than the average assistant professor and $13,375 higher than the average Associate professor in a similarly paid discipline - Micceri, T. & Takalkar, P., 1994). Therefore I estimate that the lower-level faculty estimate of $49 per SCH may be as much as 15 percent to 25 percent too high. However, the upper-level estimates should reflect mean costs per SCH fairly accurately because they make up the bulk of SCH at USF and these data should reflect approximately the mix of overall faculty at USF, because Full and Associate professors tend to teach upper-level courses more than assistant professors, particularly the 4000 (senior) level courses. Note that we should expect similar cost phenomena to occur for both adjuncts and GTAs (higher pay at higher levels), although not to the same degree as for the ranked faculty. We should therefore expect the overall estimates based on lower- and upper-level costs to be within a reasonable degree of accuracy, and the total costs to be quite accurate.

The Metropolitan University Group (MUG) consists of 24 universities in Carnegie classifications Research I, Research II, Doctoral I or Doctoral II located in metropolitan areas of at least 100,000 with student headcounts of at least 15,000 and having a large portion of part-time students. These are: USF, UCF, FIU, VCU, Temple, North Carolina State, Minnesota-Twin Cities, Wayne State, UAB, Wisconsin-Milwaukee, Houston-University Park, U of Texas-Arlington, Louisville, Akron, Georgia State, Memphis, Wright State, Old Dominion, George Mason, San Diego State, Portland State, Wichita State and Missouri-St. Louis.

Figure 14
Linear Regression Model Fit to Historic Faculty FTE Percentages